

The invention relates generally to the task of printing postage indicia, typically a replica of a franked meter impression, in a home or small office. It relates more particularly to such printing with the use of a television set-top box or web television interface.

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Background of the invention

For many decades, postage has been applied to mail pieces in several ways, most commonly postage stamps, and imprints by postage meters (franking machines). Both technologies are very well developed and accepted. A postage meter, for example, uses a secure printer with a printing plate that is not accessible to the customer and that is not easily counterfeited. The postage meter also uses fluorescent ink, thus differing from other inks. One of the defining characteristics of a typical traditional postage meter is a secure housing, within which are located an accounting means and the printing means including the aforementioned printing plate. The accounting means registers the amount of postage printed and/or the amount of postage paid for that may be printed, these registered amounts respectively termed the "ascending register" and "descending register." The accounting means is set directly by a postal authority or is remotely reset through a mechanism approved by the postal authority.

In recent years it has been suggested by some postal authorities that postage be indicated by means of printed indicia which are printed by conventional (non-secure) printers such as laser printers, ink-jet printers, and thermal transfer printers. Such a proposal immediately raises the question of counterfeiting. It is to be anticipated that some persons would be motivated to attempt to use just such conventional printers to generate printing which would permit a mail piece to be delivered without paying any postage amount. To attempt to counter such fraudulent activity, postal authorities have proposed to provide information in the postal indicia which would permit detection of fraud. This information would be generated by cryptographic means and would be authenticated by cryptographic means. Postal authorities have suggested that such information would be printed by means of a two-dimensional bar code, and that the bar code would have some redundancy to attempt to permit reading of the

bar code even after smudging or obliteration of portions of the bar code.

A typical arrangement as envisioned by some postal authorities calls for a PSD (postal security device) which has a secure housing and which contains counterparts to the aforementioned ascending and descending registers. The PSD's connections to the rest of the system are purely electrical. In this way the secure housing of the PSD differs greatly from the secure housing of the traditional postage meter, because the secure housing of the traditional postage meter has an opening, or more than one opening, through which is passed the mail piece or package label that is to receive the printed indicium.

The PSD contains processing capability for establishing cryptographically secure communication with a postal authority, which permits setting and reading the ascending and descending registers and related information. It contains nonvolatile memories for the registers and for cryptographic keys. It contains firmware to permit generation of data to be used for printing of postal indicia. One arrangement for a PSD is that set forth in PCT publication 98-20461 entitled "System for protecting cryptographic processing and memory resources for postal franking machines."

The PSD may contain a secure and reliable real-time clock and calendar, or alternatively it may employ a cryptographically secure substitute for such a real-time clock and calendar as described in PCT publication 98-08325 entitled "Printing postage with cryptographic clocking security."

In the typical arrangement as envisioned by some postal authorities and by some companies seeking to offer such services, the PSD is located physically nearby to the printer. For example it may be a "button" integrated circuit plugged into a socket that is connected to a personal computer with a printer.

Alternative topologies are described for example in PCT publication 98-13790 entitled "Proof of postage digital franking." In that publication it is proposed to link a PSD to one or more printers for printing of postal indicia, for example through a local area network. Such an

arrangement could be useful in a business or office setting.

Despite the development of these and other proposed ways of arranging a system including a PSD and one or more printers, there is a need for a system suitable for homes and small businesses. There is a need for such a system composed largely of existing and off-the-shelf equipment, that requires little or no additional expenditure of money or installation of new equipment. There is a need for such a system that does not require a personal computer and the attendant expense and potential for malfunction.

Summary of the invention

The invention solves the problem of printing postage indicia, typically a replica of a franked meter impression, in a home or small office, with the use of a television set-top box or web television interface. The system brings the ability of printing postage stamps on label stock.

Description of the drawing

Fig. 1 is a functional block diagram of the system according to the invention.

Detailed description

In the system disclosed herein, a postage indicium is printed onto a self-adhesive or water-activated label. The indicium is printed using a printer 81, which may be a printer supplied with a set-top box 70 for web television viewing. For example, in some web television viewing systems, a printer is provided for printing information for the user or for printing store coupons or other incentives. It has been suggested, for example, to have an incentive associated with a pay-per-view movie, such as a coupon which may be redeemed for some product or activity connected with the movie. The printer 81 used for such coupons could be employed to print postage indicia on label stock. The set-top box 70, printer 81, television 83, and remote control 88 are collectively termed the customer station.

The sequence of events may be as will now be described. The customer identifies himself or herself to the Host Data Center 65 (sometimes simply called a "host"), via a communications link 60 which is preferably the Internet but which could optionally be a private network operated by the service provider. The user employs a television remote control device 88 to send signals to the set-top box 70, and calls up a submenu relating to postage. The submenu is displayed on the screen of the television 83. The menu requires the customer to enter an identification, and this together with a unique identifier associated with the set-top box 70 is transmitted to the Host Data Center 65. The Host Data Center 65 confirms that the identification and identifier are valid. The user inputs may be by means solely of inputs by the remote control device 88 or may be accomplished in part by means of an external keyboard, omitted for clarity in Fig. 1.

Optionally the user may enter information about the mail piece, such as the destination address or the Zip code of the destination address. The postal indicium generated may thus carry the Zip code or the entirety of the destination address in a cryptographically signed form, which permits postal authorities to confirm that the indicium does in fact correspond to the mail piece. (This permits detection of fraudulent use of an indicium for a second or third time on a mail piece with a different Zip code or destination address.) In addition, the information printed on the label printer 81 (on label stock 82) may include not only the postal indicium but also the mailing address and a sorting bar code containing the Zip code. The label is affixed by the customer to the mail piece (omitted for clarity in Fig. 1) and is entered into the mail stream. The postal authority may then scan the indicium and perform a cryptographic authentication to confirm the validity of the indicium.

If the customer has printed more than one label, then there is the danger that the customer would inadvertently place a label on the wrong mail piece, that is, a mail piece that does not correspond with the label. To minimize this risk, it is desirable to print on the label not only the bar code, which is not human-readable, but also some human-readable information to guide the customer in identifying the corresponding envelope. This information could include the aforementioned Zip code and other information to resolve any question in the case of two mail pieces going to the same Zip code.

Optionally a scale 80 is provided which is communicatively coupled to the set-top box. In this arrangement, the data sent to the Host Data Center 65 includes the mass of the mail piece (placed upon the scale) and the appropriate postage value is calculated and used in generating the postal indicium. The postage value is thus contained within the indicium and the customer is charged for the corresponding amount of postage.

Alternatively the customer may communicate the mass of the mail piece by means of key entries at the remote control 88 or at the aforementioned keyboard.

Those skilled in the art will appreciate that at present, speech recognition technologies are of limited utility. It is expected, however, that speech recognition may be used for customer identification as described above, for communicating the mail piece destination address, and for communicating the mass of the mail piece, as well as other functions such as indicating the class of service (mail type) such as first class, air mail, etc.

The Host Data Center 65 contains one or more PSDs 10A, 10B, 10C. Each PSD contains security-critical functions for the postal indicia customer. In one arrangement, there are as many PSDs as there are customers and they correspond to each other. In another, preferred, arrangement, there are fewer PSDs than there are customers, and the operator of the Host Data Center 65 maintains its own set of accounts with respect to the various customers. The PSD contains a random number generator, various storage registers, an optional date/time clock, and other circuitry. The PSD supports device authorization, finance record-keeping, creation of indicia, and audit functions. In sum, the PSD ensures that only authorized persons are able to apply indicia to mailpieces, and ensures that the indicia are accounted for. Although the PSD may be located in or nearby to the set-top box 70, it is considered preferable for it to be located distant from the customer location, namely within the Host Data Center 65.

It is expected that the set-top box has identification functions which are usable for authenticating users when they order pay-per-view movies and the like, and these functions rely upon a tamper-proof identifier within the set-top box 70 as well as upon cryptographic

functions of modest security. The built-in capability of the set-top box may include a fingerprint reader in which case the fingerprint authentication may be used as well. These functions may be combined with the above-mentioned user authentication steps to improve the level of confidence regarding the authentication of the customer.

5 It should be appreciated that nothing about the system described herein need be limited to a single provider of delivery services. For example, the Host Data Center 65 may offer the ability to print indicia for the US Postal Service, for Federal Express, and for UPS. It may be able to give the customer information such as price comparisons. In such a system, there is provided a PSD or its functional equivalent corresponding to each of the delivery service
10 providers. The host 20 has communications links to the various carriers 30A, 30B, and 30C.

It should also be appreciated that many services are capable of being tracked based on a package tracking number. The shipping label 82 may contain a tracking number generated by the delivery service provider, provided in bar code form for tracking purposes. In such an arrangement, the Host Data Center 65 or the set-top box 70 may retain a list of such tracking
15 numbers, which makes it easy for the customer to track mail pieces. Typically the customer would use the remote control 88 or the optional keyboard to enter a tracking menu, and would select one or more packages to be tracked. The tracking results would be displayed on the screen of the television 83.

Those skilled in the art will appreciate that the term "set-top box" does not literally require
20 location on the top of the television set, and rather that the box permits connection between a conventional broadcast television and enhanced services such as pay-per-view television. Indeed it is expected that the set-top box may come to be contained in the same housing as the television, at such time as the set-top box becomes standardized within a particular country or market area, all without departing in any way with the invention.

25 The Host 20 includes such functions as providing network access to the carriers 30A, 30B, 30C; customer account control; identification access control; funds debit and credit control; cryptographic certificate control; and audit control. Processor 40 provides communications

protocol and message integrity control, which in a preferred embodiment uses TCP (transmission control protocol) as a way of assuring message integrity, and uses higher-level protocols to carry out customer sessions. Finally, functional block 50 provides communications interfacing, for example via frame relay to the Internet or via other communications-layer protocols for satellite, dedicated data line, analog modem, or television cable communications.

The Host Data Center 65 is thus able to serve as a single point of contact for each of several delivery service providers.

In an alternative embodiment, the Host Data Center 65 communicates with the customer station at the customer's location by means of an enhanced fax machine 90 which is connected to the Internet 60 or other communications channel by an appropriate means. The fax machine is, of course, connected with the public switched telephone network and responsive to incoming fax telephone calls for receiving and printing fax messages. The fax machine interfaces with a printer 91 printing on label stock 92, much like the printer 81 and label stock 82. An optional scale 93 is connected with the fax machine 90. Optionally a personal computer 94 may be connected with the fax machine 90 to permit easy user inputs and display of information from the Host Data Center 65.